

CLAIMS

1. A device (1) for the management of electrical sockets (2) connected to a branch (100) of an a.c. electrical network for domestic or industrial use, characterized in that it comprises:
  - monitoring means (10) dedicated to detection of the presence/absence of a load connected to the socket (2); and
  - management means (200) for managing the level of voltage in said branch (100) of electrical network, comprising a processing unit (20) for processing the information sent by said monitoring means, and an intervention unit (30) applied to said branch (100) of electrical network controlled by said processing unit (20);  
said intervention unit (30) comprising means for variation of the level of a.c. voltage according to the conditions of the applied load.
2. The device (1) for the management of electrical sockets (2) according to Claim 1, characterized in that said monitoring means (10) comprise current sensor means (11) that produce a first signal representing the current circulating in said branch of electrical network (100) and means for recognition of the presence/absence of a load.
3. The device (1) for the management of electrical sockets (2) according to Claim 2, characterized in that said current sensor means (11) comprise at least one amperometric transformer.
4. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that said monitoring means (10) comprise a first module (12) for conversion and filtering of said signal representing the current, and a second module (13) for recognition of the presence/absence of a load applied to the socket (2), said first module (12) being connected at input to said current sensor means (11) and supplying at output a second filtered signal representing the current circulating in said branch (100) of electrical network, said second module (13) being connected at input to said first module (12) and supplying at output a third signal representing the presence/absence of a load applied to the socket (2).
5. The device (1) for the management of electrical sockets (2) according to Claim 4, characterized in that said second module (13) comprises means for analysis of the level of intensity of said second filtered signal.
6. The device (1) for the management of electrical sockets (2) according to Claim 5, characterized in that said analysis means supply said third signal of presence/absence of

the load when the level of current detected is, respectively, higher/lower than a pre-set value.

7. The device (1) for the management of electrical sockets (2) according to one or more of Claims 2 to 6, characterized in that the input of said processing unit (20) is connected to said means for recognition of the presence/absence of a load and supplies, to said means for variation of the level of voltage (30), a first control signal corresponding to the passage from a situation of presence of load to a situation of absence of load, and a second control signal corresponding to the passage from a situation of absence of load to a situation of presence of load.
8. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that said means (30) for variation of the voltage level comprise:
  - a first device (31) for connection/disconnection of a first part (50) to/from a second part (51) of said branch (100) of electrical network, said first part (50) being connected to the rest of the branch (100) of the electrical network, said second part (51) being connected to the socket (2);
  - a voltage transformer with its primary winding (40) connected to said first part (50) and with its secondary winding (41) connected to said second part (51); and
  - a second device (33) for connection/disconnection of said secondary winding to/from said second part (51).
9. The device (1) for the management of electrical sockets (2) according to Claim 7 or Claim 8, characterized in that, following upon said first control signal, the first connection/disconnection device (31) disconnects said first part (50) from said second part (51), whilst the second device (33) connects said secondary winding (41) to said second part (51).
10. The device (1) for the management of electrical sockets (2) according to any one of Claims 7 to 9, characterized in that, following upon said second control signal, the first connection/disconnection device (31) connects said first part (50) to said second part (51), whilst the second device (33) disconnects said secondary winding (41) from said second part (51).
11. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that said monitoring means (10) comprise means

for recognition of a state of overload.

12. The device (1) for the management of electrical sockets (2) according to Claim 11, characterized in that said means for recognition of a state of overload comprise a third module (14) for recognition of a state of overload, said third module (14) being connected at input to said first module (12) and supplying at output a signal representing a condition of overload.
13. The device (1) for the management of electrical sockets (2) according to Claim 12, characterized in that said third module (14) comprises means for analysis of the level of frequency of said second filtered signal representing the current circulating in said branch (100).
14. The device (1) for the management of electrical sockets (2) according to Claim 13, characterized in that said analysis means supply said signal characteristic of a state of overload when the level of frequency detected is higher, for a pre-defined time interval, than a first pre-defined threshold level.
15. The device (1) for the management of electrical sockets (2) according to one or more of Claims 11 to 14, characterized in that the input of said processing unit (20) is connected to said means for recognition of a state of overload and supplies to said means (30) for variation of the voltage level a third control signal corresponding to onset of a state of overload, and a fourth control signal when said state of overload ceases.
16. The device (1) for the management of electrical sockets (2) according to Claim 15, characterized in that, following upon said third control signal, the first connection/disconnection device (31) disconnects said first part (50) from said second part (51), whilst said second device (33) connects said secondary winding (41) to said second part (51).
17. The device (1) for the management of electrical sockets (2) according to Claim 15 or Claim 16, characterized in that, following upon said fourth control signal, the first connection/disconnection device (31) connects said first part (50) to said second part (51), and said second device (33) disconnects said secondary winding (41) from said second part (51).
18. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that said monitoring means (10) comprise means for recognition of a state of short circuit.

19. The device (1) for the management of electrical sockets (2) according to Claim 18, characterized in that said means for recognition of a state of short circuit comprise a fourth module (15) for recognition of a state of short circuit, said fourth module (15) being connected at input to said first module (12) and supplying at output a signal representing a condition of short circuit.
20. The device (1) for the management of electrical sockets (2) according to Claim 19, characterized in that said fourth module (15) comprises means for analysis of the level of frequency of said second filtered signal representing the current circulating in said branch (100).
21. The device (1) for the management of electrical sockets (2) according to Claim 20, characterized in that said analysis means supply said signal characteristic of a condition of short circuit when the level of frequency detected is higher than a second pre-defined threshold level.
22. The device (1) for the management of electrical sockets (2) according to one or more of Claims 19 to 21, characterized in that the input of said processing unit (20) is connected to said means for recognition of a state of short circuit and supplies to said means for variation of the voltage level (30) a fifth control signal corresponding to the onset of a state of short circuit.
23. The device (1) for the management of electrical sockets (2) according to Claim 22, characterized in that, following upon said fifth control signal, the first connection/disconnection device (31) disconnects said first part (50) from said second part (51), and the second device (33) disconnects said secondary winding (41) from said second part (51).
24. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that said monitoring means comprise means for recognition of a ground fault.
25. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that it comprises means for signalling a situation of presence/absence of a load, a situation of overload, or a situation of short circuit.
26. The device (1) for the management of electrical sockets (2) according to one or more of the preceding claims, characterized in that it comprises means for detecting a possible contact of a person with a socket or other live parts.

27. The device (1) for the management of electrical sockets (2) according to claim 26, characterized in that said means for detecting a possible contact of a person with a socket or other live parts comprise means for maintaining, on a socket with no load applied, a very low safety voltage having sinusoidal waveform and a frequency of about 10 kHz.
28. An electrical socket of a domestic type comprising a device for the management of the socket itself according to one or more of Claims 1 to 25, characterized in that said signalling means comprise warning lights and/or acoustic alarms.